

KEY et al  
Appl. No. 10/528,387  
February 28, 2008

### **REMARKS/ARGUMENTS**

Reconsideration of this application is requested. Claims 1-9 and 11-16 are in the case.

#### **I. THE 35 U.S.C. §112, SECOND PARAGRAPH REJECTION**

Claims stand rejected under 35 U.S.C. §112, as allegedly indefinite in view of the expression "a reactive derivative thereof". In response, it is believed there is nothing indefinite about this expression. One of ordinary skill would readily understand what is meant by "a reactive derivative thereof", as evidenced by the use of that or similar expressions in a similar context in documents cited in the present application, such as EP 0749948, EP-A-0849248, EP-A-0849249, and EP-A-1 002785. Withdrawal of this rejection is accordingly respectfully requested.

#### **II. THE ANTICIPATION REJECTIONS**

Claims 1-8 and 11-15 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by EP 0709948 to Baker et al. In addition, claims 1-3, 5, 6 and 12-13 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by Sunley et al (Catalysis Today, 58 (2000) 293-307). The rejections are respectfully traversed.

As claimed the invention provides a process for producing acetic acid by carbonylating methanol and/or a reactive derivative thereof with carbon monoxide in at least one carbonylation reaction zone containing a liquid reaction composition. The liquid reaction composition comprises an iridium carbonylation catalyst, methyl iodide co-catalyst, a finite concentration of water, acetic acid, methyl acetate, at least one

KEY et al  
Appl. No. 10/528,387  
February 28, 2008

promoter selected from ruthenium, osmium and rhenium and at least one catalyst system stabiliser selected from indium, cadmium, mercury, gallium and zinc. The molar ratio of iridium : promoter : stabiliser in the liquid reaction composition is maintained in the range 1 : (greater than 2 to 15) : (0.25 to 12).

Baker describes a process for the production of a carboxylic acid by carbonylation of an alcohol and/or reactive derivative thereof in the presence of an iridium catalyst and at least one promoter selected from cadmium, mercury, zinc, gallium, indium and tungsten, with an optional co-promoter selected from ruthenium, osmium and rhenium. In Table 3 of Baker (page 9), there is specifically disclosed, in Example 13, a molar ratio of Ir : Ru : Ga of 1 : 2 : 2 and, in Example 14, there is specifically disclosed a molar ratio of Ir : Ru : In of 1 : 2 : 2. Thus, Baker provides a specific disclosure of Ir : Ru (promoter) of 1 : 2 in combination with a molar ratio of Ga/In of 2. However, nowhere in Baker is there a specific disclosure of a system of Ir : (In or Ga, etc.) of 1 : (0.25 to 12) combined with a molar ratio of (Ru or Os or Re) of (greater than 2 to 15).

Similarly, Sunley et al. discloses, in Experiments 13 and 14 in Table 2 on page 299, a molar ratio of Ru : Ir : In of 1 : 1 : 5 and Ru : Ir : Zn of 1 : 1 : 5. Nowhere in Sunley is there any disclosure of a molar ratio of iridium : promoter : stabiliser of 1 : (greater than 2 to 15) : (0.25 to 12).

Neither Baker nor Sunley et al. discloses the invention as claimed. Withdrawal of the anticipation rejections is accordingly respectfully requested.

KEY et al  
Appl. No. 10/528,387  
February 28, 2008

### III. THE OBVIOUSNESS REJECTION

The presentation of the rejection on page 6 of the Action is unclear. On page 5, the heading "Claim Rejections – 35 USC §103" appears and, at the bottom of page 5, a quotation of 35 U.S.C. §103 is introduced. On page 6, it is stated that claims are rejected under 35 U.S.C. 103(a) as being "unpatentable over \*\*\*", but no claims or citation are recited in this sentence. In the next paragraph on page 6, claims 1-9 and 11-16 are rejected "under 35 U.S.C. 102(b) as clearly anticipated" by Baker et al. It is believed that the Examiner intended here to make an obviousness rejection rather than an anticipation rejection, since claims 1-8 and 11-15 have already been rejected on page 3 of the Action as anticipated by Baker et al. For purposes of the present response, it is assumed that the Examiner intended the rejection recited in paragraph 3 on page 6 onwards of the Action to be an obviousness rejection. The rejection is respectfully traversed.

The present invention relates to the carbonylation of methanol and/or reactive derivative thereof to produce acetic acid. Processes employing iridium as the carbonylation catalyst typically employ at least one of Ru, Os or Re. The function of Ru/Os/Re is to provide an enhancement in the carbonylation rate over that achieved by iridium alone. Such rates may be improved further by increasing the amount of Ru/Os/Re with respect to iridium (page 1 lines 16-18). However, a consequence of such elevated Ru, Os or Re : iridium ratios is an increased tendency for the precipitation of catalyst and promoter metals to occur (page 1 lines 18-20). A high Ru/Os/Re concentration is a ratio of Ru/Os/Re to iridium of greater than 2 :1. Thus, the technical problem sought to be solved is to reduce catalyst precipitation at high Ru, Os, Re :

KEY et al  
Appl. No. 10/528,387  
February 28, 2008

iridium molar ratios (i.e greater than 2 :1) in the iridium catalysed carbonylation of methanol and/or reactive derivative thereof.

The present invention solves this problem by employing a defined amount of a component selected from indium, cadmium, gallium, mercury and zinc. That this problem has been solved can be seen in Table 1 on page 12 of the specification. In Table 1 in Expt A, where a high concentration of promoter to iridium is used (6 :1) and no stabiliser is present, precipitation of the Ir/Ru occurs. However, in Examples 1, 2 and 3, in which a stabilizer of the invention is added to the Ir/Ru system, precipitation of Ir/Ru is prevented.

Baker is directed to improving carbonylation rate by the addition of a promoter. Baker is silent as to the problem of preventing precipitation of an Ir/promoter system in which high concentrations of promoter are present. In fact, there are no experiments in Baker which employ a high concentration of ruthenium, osmium or rhenium promoter. Examples 13 and 14 employ a ratio of Ru Ir of 2 :1. At such a ratio, precipitation is not a problem. Thus, since Baker is not concerned with the problem of preventing catalyst precipitation and furthermore does not disclose or suggest a solution to such a problem, the person of ordinary skill, seeking to find a solution to the problem of preventing catalyst precipitation at high promoter concentrations, could not and would not have been motivated to arrive at the subject matter of the claims of the present application based on Baker.

It is also noted that the additives Zn and In are described by Sunley et al. to enhance the carbonylation rate (page 299, section 7.1.4, 1st sentence). Further, the ratio of Ru : Ir is only 1 : 1. There is no disclosure or suggestion in Sunley et al. of the

KEY et al  
Appl. No. 10/528,387  
February 28, 2008

problem of catalyst/promoter precipitation nor of any solution(s) thereto. Thus, the person of ordinary skill, seeking to find a solution to the problem of catalyst precipitation at high concentrations of promoter, would have been unable to arrive at the subject-matter of claims 1 to 10 of the present application based on Sunley et al.

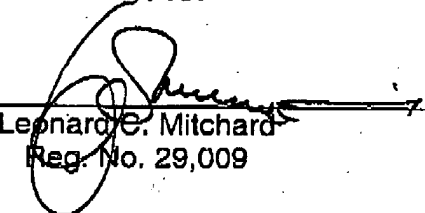
The cited art fails to give rise to a *prima facie* case of obviousness in this case. Withdrawal of the obviousness rejection is respectfully requested.

Favorable action is awaited.

Respectfully submitted,

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